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REMARKS

Claims 8-11 are all the claims presently pending in the application. Claims 8-10 have been amended to more particularly define the claimed invention.

Entry of this Amendment is believed proper since no new issues are being presented to the Examiner that would require further consideration and/or search.

It is noted that the claim amendments are made only for more particularly pointing out the invention, and not for distinguishing the invention over the prior art, narrowing the claims or for any statutory requirements of patentability. Further, Applicants specifically state that no amendment to any claim herein should be construed as a disclaimer of any interest in or right to an equivalent of any element or feature of the amended claim.

Claims 8 and 9 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Ono (U.S. Patent No. 6,411,765). Claims 10 and 11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Ono in view of Hecht (Understanding Fiber Optics, Fourth Edition).

These rejections are respectfully traversed in the following discussion.

I. THE CLAIMED INVENTION

The claimed invention of exemplary claim 8 provides an optical waveguide including a core wherein a width of a part corresponding to a core of the photomask is wider than a design width of the core (e.g., see Application at page 6, lines 10-13).

The claimed invention of exemplary claim 10 provides an optical waveguide including a core wherein a width of the core, d , is represented by the formula:
$$d < 1.45\lambda / (2(\sqrt{n_{\text{core}}^2 - n_{\text{clad}}^2}))$$

The claimed invention, as defined by exemplary claims 8 and 10, is able to form a core of an optical waveguide having a width that matches the required (i.e., the designed) dimensions, while avoiding residues by etching (e.g., see Application at page 6, lines 16-17).

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II. THE PRIOR ART REFERENCES

A. Claims 8 and 9

The Examiner alleges that Ono teaches the claimed invention of claims 8 and 9. Applicants submit, however, that there are elements of the claimed invention, which are neither taught nor suggested by Ono.

That is, Ono does not teach or suggest “*wherein a width of a part of the photomask corresponding to the core is wider than a design width of the core*”, as recited in claim 8.

The Examiner attempts to rely on Figure 12 of Ono to support his allegations. The Examiner, however, is clearly incorrect.

Indeed, nowhere in this passage (nor anywhere else for that matter) does Ono teach or suggest an optical waveguide including a core wherein a width of a part of the photomask corresponding to a core of the photomask is wider than a design width of the core. Indeed, Ono does not even mention a relationship between the width of the core and a width of the core of the photomask, let alone teach or suggest the specific relationship recited in exemplary claim 8. The Examiner does not even allege that Ono teaches or suggests this feature of the claimed invention.

Indeed, the Examiner merely alleges that this feature of the claimed invention is a product-by-process limitation, which allegedly should not be given patentable weight. Specifically, regarding the alleged product-by-process limitations, the Examiner indicated that he “did not give patentable weight to those limitations since they do not further contribute to the structural limitation of the optical waveguide. The end product of Ono is reasonably the same as the claimed invention” (see Office Action dated March 22, 2006 at page 2). The Examiner, however, is clearly incorrect.

The M.P.E.P., with respect to product-by-process claims, states that “[o]nce the examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product” (see M.P.E.P. § 2113; emphasis added by Applicants).

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As indicated above, the claimed product has a core width that matches a width of the designed core. The core of Ono may not include a core width that matches a designed core width due to the etching of the core layer (e.g., see Ono at column 8, lines 4-6).

Applicants submit that, conventionally, chemical etching results in the width of a patterned core being narrower than the desired width of the designed core, due to over-etching. However, a width of a part of the photomask corresponding to a core of the photomask is wider than a design width of the core, as recited in the claimed invention, the resulting width of the core will have a width that matches the designed width. This unobvious feature is not recognized, let alone taught or suggested, by Ono.

Therefore, Applicants submit that there are elements of the claimed invention that are not taught or suggest by Ono. Therefore, the Examiner is respectfully requested to withdraw this rejection.

B. Claims 10 and 11

The Examiner alleges that Ono would have been combined with Hecht to teach the claimed invention of claims 10 and 11. Applicants respectfully submit, however, that these references would not have been combined as alleged by the Examiner and that, even if combined, the alleged combination of references would not teach or suggest each and every feature of the claimed invention.

That is, Applicants submit that neither Ono nor Hecht, nor any combination thereof, teaches or suggests an optical waveguide including a core "*wherein a width of the core, d , is represented by the formula: $d < 1.45\lambda / (2(\sqrt{n_{core}^2 - n_{clad}^2}))$* ", as recited in exemplary claim 10.

The Examiner concedes that Ono does not teach or suggest that a width of the core is represented by the formula: $d < 1.45\lambda / (2(\sqrt{n_{core}^2 - n_{clad}^2}))$ (see Office Action dated March 22, 2006 at page 3). The Examiner, however, alleges that "Hecht discloses the expression for modal properties as a function of the core width, wavelength, and numerical aperture (page 77) and further interpreted the expression in term of core diameter (page 82) thus it clearly shows that diameter is an optimizable range that is a function of the operational wavelength λ and the numerical aperture" (e.g., see Office Action dated March 22, 2006 at pages 3-4).

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Furthermore, the Examiner alleges that “[i]t would have been obvious to one having ordinary skill in the art at the time invention was made to optimize the waveguide core width with respect [to] the specification of the waveguide operational wavelength and the material used for the core and the clad that determine the numerical aperture. It has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art” (see Office Action dated March 22, 2006 at page 4). The Examiner, however, is clearly incorrect.

First, Applicants submit that Hecht would not have been combined with Ono as alleged by the Examiner. Indeed, section 2142 of the MPEP states: “To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings.” (Emphasis added by Applicants).

The Examiner has not provided any suggestion or modification for combining the teachings of Hecht with the teachings of Ono. Indeed, the Examiner has merely provided reasoning for optimizing the waveguide core width with respect to the operational wavelength of the material used for the core. However, the Examiner has not provided any reasoning why one of ordinary skill in the art would consult the teachings of Hecht in order to modify or improve the invention of Ono.

Therefore, the Examiner has clearly failed to establish a *prima facie* case of obviousness.

Moreover, Hecht fails to make up the deficiencies of Ono. Indeed, nowhere does Ono teach or suggest an optical waveguide including a core wherein a width of the core, d, is represented by the formula: $d < 1.45\lambda / (2(\sqrt{n_{\text{core}}^2 - n_{\text{clad}}^2}))$. Indeed, the Examiner does not even allege that Hecht teaches the specific formula recited in the claimed invention.

However, the Examiner alleges that, based on the teachings of Hecht, it would have been obvious to “optimize the waveguide core width with respect [to] the specification of the waveguide operational wavelength and the material used for the core and the clad that determine the numerical aperture” (see Office Action dated March 22, 2006 at page 4). The Examiner, however, is clearly incorrect.

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That is, the M.P.E.P. clearly sets forth that only result-effective variables can be optimized. Thus, "[a] particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation" (see M.P.E.P. § 21144.05) (emphasis added by Applicants). Here, the cited reference does not teach or suggest that the width of the core of the photomask, in relation to the width of the core of the waveguide, may have any effect on the propagation characteristics of the optical waveguide. Hecht does not recognize this feature. Therefore, it is clearly unreasonable to suggest that these references teach or suggest that a width of a core of the photomask is merely a result-effective variable.

Thus, Hecht fails to make up the deficiencies of Ono.

Therefore, Applicants submit that these references would not have been combined as alleged by the Examiner and that, even if combined, the alleged combination of references would not teach or suggest each and every feature of the claimed invention.

III. FORMAL MATTERS AND CONCLUSION

In view of the foregoing, Applicants submit that claims 8-11, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.


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The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481

Respectfully Submitted,

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FACSIMILE TRANSMISSION

I hereby certify that I am filing this paper via facsimile, to Group Art Unit 2824, at (571) 273-8300, on May 22, 2006.

Respectfully Submitted,

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